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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/087,662	03/01/2002	Klaus Hartig	44046.203.235	7897

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EXAMINER	
BLACKWELL RUDASIL, GWENDOLYN A	

ART UNIT	PAPER NUMBER
1775	

DATE MAILED: 12/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/087,662	HARTIG ET AL.	
	Examiner	Art Unit	
	Gwendolyn A. Blackwell-Rudasill	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 March 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5,6* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Specification

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> *A person shall be entitled to a patent unless –*
>
> *(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.*

3. Claims 1-4, 7-12, and 16-22 are rejected under 35 U.S.C. 102(b) as being anticipated by United States Patent no. 5,837,361, Glaser et al.

Glaser et al disclose a substrate coated a multilayered coating that has low emissivity and high light transmission, (column 2, lines 40-46). The transparent substrate has a lower coating on the substrate comprised of a first layer of silicon or a metal and nitrogen or oxygen and a second layer comprising zinc oxide, a functional layer on the lower coating and an upper coating comprising a dielectric material on the functional coating wherein the functional coating comprises silver, (columns 2-3, lines 61-33). The thickness of the underlying first layer of the lower coating ranges from 5-35 nm (30-350 Å), meeting the requirements of claims 1-4, 7-8, and 21, (column 3, lines 45-47).

Glaser et al also disclose that a sacrificial layer based on a metal such as niobium, titanium, tin, or tantalum can be placed on the functional layer, meeting the requirements of claims 9-10, (column 3, lines 49-61). The upper coating that lies above the functional layer can be zinc oxide and/or a layer of silicon nitride, meeting the requirements of claims 11-12, (column 3, lines 62-66).

Glaser et al further disclose that more than one functional layer can be provide wherein the upper coating of the functional layer closest to the substrate separates the functional layers, meeting the requirements of claims 16-22, (column 4, lines 45-58).

4. Claim 44 is rejected under 35 U.S.C. 102(b) as being anticipated by United States Patent no. 5,935,702, Macquart et al.

Macquart et al disclose a glass substrate having a low emissivity stack wherein the stack can have the following configuration, meeting the requirements of claim 44, (column 7, lines 40-50) and Example 3, (column 11, lines, 38-65):

glass/SiO_2 or SiO_xC_y/ZnO/Ag/Nb/ZnO/Si_3N_4 or AlN

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> *(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.*

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-4, 7-10, 21, and 23-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over European Patent Application Publication no. 0747330, EP '330 in view of United States Patent no. 5,935,702, Macquart et al.

EP '330 disclose a transparent substrate having a low emissivity coating. The coating is a multilayered coating wherein the layer closest to the substrate can be silicon oxide, the second layer can be a suboxide of zinc, tantalum, or a mixture of zinc and tantalum, the third layer can be silver, the fourth layer, can be titanium, chromium, niobium or an alloy or suboxide of the aforementioned metals, with a fifth layer being the same as the material of the first layer, (page 8, claim 1). EP '330 does not specifically disclose the thickness of the silicon oxide layer as exemplified by Applicant.

Macquart et al disclose a glass substrate having reflective properties in the infrared and/or solar ranges, which is akin to a low emissivity coating on a glass substrate. Between the substrate and the metal reflective layer is a layer that is in contact with the substrate that is provided to act as a barrier layer for the diffusion of oxygen and alkalines. It is preferred that the layer have a refractive index of 1.45 which is very near the refractive index of the substrate. Silicon oxide

can be used as the barrier layer having a thickness ranging from 10 nm or more, (column 5, lines 7-24). Soda lime silica glass can be used for the substrate, (column 9, lines 10-13).

EP '330 and Macquart et al disclose inventions utilizing glass substrates with a multiple layered coating containing an infrared reflective film. Based upon the teaching of Macquart et al, it would have been obvious to one skilled in the art at the time of invention to modify the film structure of EP '330 with the silicon oxide coating to create a low emissivity film structure that provides barrier protection to the layers overlying the substrate by preventing the diffusion of oxygen and alkaline in addition to preventing the modification of the optical and thermal properties when the substrate is submitted to thermal treatment, (Macquart et al, column 3, lines 17-28).

Absent a showing of criticality with respect to thickness (a result effective variable), it would have been obvious to a person of ordinary skill in the art at the time of the invention to adjust the thickness of the silicon oxide layer through routine experimentation in order to achieve a low emissivity coating on a glass substrate wherein the silicon oxide serves as an effective barrier for the diffusion of oxygen and alkalines without interfering with the transparency of the coating nor the desired optical properties. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

8. Claims 1-29, 44-45, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over International Patent Application Publication no. 97/48649, WO '649, in view of United States Patent no. 5,935,702, Macquart et al, further in view of Applicant's admission.

WO '649 disclose a glass substrate having a multilayered coating that is highly reflective in the infrared range, (page 3, lines 13-15). Example 2 utilizes a coating structure as follows, (page 15, lines 10-23):

Si_3N_4/ZnO/Ag/Nb/ZnO/Si_3N_4/ZnO/Ag/Nb/ZnO/ Si_3N_4.

Example 4 demonstrates a coating structure as follows :

ZnO/Ag/Nb/ZnO/Si_3N_4/ZnO/Ag/Nb/ZnO/TiN/Si_3N_4.

WO '649 do not specifically disclose that SiO_2 can be used as an undercoat layer next to the glass substrate.

Macquart et al disclose a glass substrate having reflective properties in the infrared and/or solar ranges, which is akin to a low emissivity coating on a glass substrate. Between the substrate and the metal reflective layer is a layer that is in contact with the substrate that is provided to act as a barrier layer for the diffusion of oxygen and alkalines. It is preferred that the layer have a refractive index of 1.45 which is very near the refractive index of the substrate. Silicon oxide can be used as the barrier layer having a thickness ranging from 10 nm or more, (column 5, lines 7-24). Soda lime silica glass can be used for the substrate, (column 9, lines 10-13).

Applicant discloses that it is well known in the art that glass is vulnerable when exposed to water and that it is "virtually impossible" for a manufacture to assure that the raw glass it used is completely corrosion free, (page 3, lines 25-29). Because of Applicant's admission it can be assumed that virtually any raw glass used in this invention or any invention would have a moisture corroded surface absent a showing to the contrary.

WO '649 and Macquart et al disclose inventions utilizing glass substrates with a multiple layered coating containing an infrared reflective film. Based upon the teachings of Macquart et

al, it would have been obvious to one skilled in the art at the time of invention to modify the film structure of WO '649 with the silicon oxide undercoating to create a infrared reflecting film structure that provides barrier protection to the layers overlying the substrate by preventing the diffusion of oxygen and alkaline in addition to preventing the modification of the optical and thermal properties when the substrate is submitted to thermal treatment, (Macquart et al, column 3, lines 17-28).

Absent a showing of criticality with respect to thickness (a result effective variable), it would have been obvious to a person of ordinary skill in the art at the time of the invention to adjust the thickness of the silicon oxide layer through routine experimentation in order to achieve a low emissivity coating on a glass substrate wherein the silicon oxide serves as an effective barrier for the diffusion of oxygen and alkalines without interfering with the transparency of the coating nor the desired optical properties. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

9. Claims 30-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over International Patent Application Publication no. 01/44131, WO '131, in view of United States Patent no. 5,935,702, Macquart et al.

WO '131 disclose a low emissivity coating having a layer structure comprising an inner dielectric layer, a first infrared reflective layer, an intermediate dielectric stack, a second infrared reflective layer and an outer dielectric layer wherein the intermediate dielectric stack includes alternating first and second dielectric materials. The first dielectric material of the intermediate dielectric stack can be chosen from an oxide or suboxide of a metal comprising zinc, indium, tin,

bismuth, or an alloy of zinc, indium, tin, or bismuth, and the second dielectric material comprises a nitride of a metal, which is different form the first dielectric, (pages 3-4, lines 19-28). The inner dielectric layer may comprise a single layer or two or more layers of different dielectric materials, with at least one of the layers being zinc oxide or an alloy or mixture of zinc oxide and bismuth oxide or tin oxide which is farthest away form the substrate and immediately adjacent to a first reflective layer, (page 6, lines 1-11). In order to protect the infrared reflective layer, a layer of titanium or niobium can be disposed above and below the infrared reflective layer, (pages 6-7, lines 18-5). Preferably five alternating layers of first and second dielectric materials comprise the intermediate dielectric stack wherein the first, third, and fifth layers are an oxide of the same material and the second and fourth layers are a nitride of the same material. Zinc oxide can be used as the first, third, and fifth layers while silicon nitride is used for the second and fourth layers wherein the silicon nitride layers should be amorphous, (pages 10-11, lines 13-8). The thickness of each layer that comprises the intermediate stack should be 250Å or less, (page 9, lines 2-5). WO '131 do not specifically disclose the use of silicon dioxide as the layer next to the glass substrate.

Macquart et al disclose a glass substrate having reflective properties in the infrared and/or solar ranges, which is akin to a low emissivity coating on a glass substrate. Between the substrate and the metal reflective layer is a layer that is in contact with the substrate that is provided to act as a barrier layer for the diffusion of oxygen and alkalines. It is preferred that the layer have a refractive index of 1.45 which is very near the refractive index of the substrate. Silicon oxide can be used as the barrier layer having a thickness ranging from 10 nm or more, (column 5, lines 7-24). Soda lime silica glass can be used for the substrate, (column 9, lines 10-13).

WO '131 and Macquart et al disclose inventions utilizing glass substrates with a multiple layered coating containing an infrared reflective film. Based upon the teachings of Macquart et al, it would have been obvious to one skilled in the art at the time of invention to modify the film structure of WO '131 with the silicon oxide undercoating to create a infrared reflecting film structure that provides barrier protection to the layers overlying the substrate by preventing the diffusion of oxygen and alkaline in addition to preventing the modification of the optical and thermal properties when the substrate is submitted to thermal treatment, (Macquart et al, column 3, lines 17-28).

Absent a showing of criticality with respect to thickness (a result effective variable), it would have been obvious to a person of ordinary skill in the art at the time of the invention to adjust the thickness of the silicon oxide layer through routine experimentation in order to achieve a low emissivity coating on a glass substrate wherein the silicon oxide serves as an effective barrier for the diffusion of oxygen and alkalines without interfering with the transparency of the coating nor the desired optical properties. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

10. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent Application Publication no. 2003/0180547, Buhay et al.

Buhay et al disclose a solar control coating wherein an example of a structure according to the disclosed invention is as follows, (page 2, section 0010):

Glass/zinc stannate/zinc oxide/infrared reflective film/zinc oxide/zinc stannate/zinc oxide/second infrared reflective film/zinc oxide/zinc stannate/zinc oxide/third

infrared reflective film. Buhay et al do not specifically disclose the use of silicon dioxide as the layer next to the glass substrate, the use of protective films, or the use of silicon nitride as an outermost film.

Macquart et al disclose a glass substrate having reflective properties in the infrared and/or solar ranges, which is akin to a low emissivity coating on a glass substrate. Between the substrate and the metal reflective layer is a layer that is in contact with the substrate that is provided to act as a barrier layer for the diffusion of oxygen and alkalines. It is preferred that the layer have a refractive index of 1.45 which is very near the refractive index of the substrate. Silicon oxide can be used as the barrier layer having a thickness ranging from 10 nm or more, (column 5, lines 7-24). Niobium, tantalum, titanium, chromium, nickel or an alloy of at least two of the aforementioned metals can be used as a protective layer on the infrared layer, (column 6, liens 8-14). Silicon nitride can be used as the outermost film to help block the diffusion of oxygen and to ensure the integrity of the function al layer, (column 4, lines 25-38). Soda lime silica glass can be used for the substrate, (column 9, lines 10-13).

Buhay et al and Macquart et al disclose inventions utilizing glass substrates with a multiple layered coating containing an infrared reflective film. Based upon the teachings of Macquart et al, it would have been obvious to one skilled in the art at the time of invention to modify the film structure of Buhay et al with the silicon oxide undercoating to create a infrared reflecting film structure that provides barrier protection to the layers overlying the substrate by preventing the diffusion of oxygen and alkaline in addition to preventing the modification of the optical and thermal properties when the substrate is submitted to thermal treatment, (Macquart et al, column 3, lines 17-28). It would also be within the skill of one in the art to introduce a

protective metal layer on the infrared reflective layer to control the value of light transmission and to protect the underlying reflective layer from deterioration with nitrogen, (Macquart et al, column 6, lines 15-29) as well as using silicon nitride as an outermost film to prevent diffusion of oxygen from the atmosphere in the low emissivity coating stack, (column 4, lines 25-38).

Absent a showing of criticality with respect to thickness (a result effective variable), it would have been obvious to a person of ordinary skill in the art at the time of the invention to adjust the thickness of the silicon oxide layer through routine experimentation in order to achieve a low emissivity coating on a glass substrate wherein the silicon oxide serves as an effective barrier for the diffusion of oxygen and alkalines without interfering with the transparency of the coating nor the desired optical properties. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gwendolyn A. Blackwell-Rudasill whose telephone number is (703) 305-9741. The examiner can normally be reached on Monday - Thursday; 6:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (703) 308-3822. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Gwendolyn A. Blackwell-Rudasill
Examiner
Art Unit 1775

GBR
gbr

DEBORAH JONES
SUPERVISORY PATENT EXAMINER